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Original Research Paper

ANALYSIS OF ABDOMINAL SURGICAL SITE INFECTION IN OBSTETRIC AND GYNAECOLOGICAL SURGERIES IN A TEACHING HOSPITAL

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ABSTRACT:

In the present study we observed 30 study cases to evaluate surgical site infection in Obstetric and Gynecological surgeries with reference to abdominal surgical incisions in Now rosjee Wadia maternity hospital, Mumbai in study duration of 18 months. A continuous surveillance is called for, to keep a check on the occurrence of SSI. Method : This was a retrospective observational study. Result: We observed that among all cases 43% surgeries were planned in the emergency, 20% were elective while 37% were other i.e. total abdominal hysterectomy. The common causative organism was found to be E. coli, Methicillin resistant Staphylococcus aureus. Conclusion : We can reduce the rate of SSI by proper preoperative work up. We should correct patient's diabetes, anaemia, control their blood sugar levels; treat any infective focus. Early identification of risk factors and prompt intervention can prevent further morbidities due to post-operative surgical site infection.

Keywords: Obstetrics and Gynaecological Procedure, Surgical Site Infection, E Coli, MRSA, Diabetes, Anaemia

INTRODUCTION:

In the current scenario many women are subjected to surgery for various reasons which include various Gynaecological and Obstetric causes. The effect of major surgeries has an impact on the post-operative recovery and life style. One of the major effects of surgery is on the incision and wound healing. Despite advances in operative techniques and a better understanding of the pathogenesis of wound infection and wound healing, post-operative surgical site wound infections continue to be a major source of morbidity and mortality for patients undergoing operative procedures. In high income countries, approximately 2% of surgeries are affected by Surgical Site Infections (SSI). Although the rates of SSI are low in United States of America (USA) and European countries it is second frequent type of Healthcare Associated Infections (HAI).World Health Organization (WHO) shows that SSIs are most frequently reported type of HAI in low and middle-income countries (LMICs) with a pooled incidence of 11.8 episodes of Surgical Site Infection per 100 surgical procedures. The overall incidence of wound sepsis in India is anywhere between 10%-33%. However, the incidence of wound complications in the obstetric population varies with rates ranging from 2.8% to 26.6%. 1-3 Surveillance of post-operative wound infection or surgical site infection is useful tool to demonstrate the magnitude of the problem.2Infection in Obstetrics accounts for the second most common cause of maternal mortality next to post-partum hemorrhage. Surgical Site Infection can also influence patient quality of life and work productivity because of time spent in hospital. These infections are usually caused by exogenous and/or endogenous micro-organisms that enter the operative wound either during the surgery (primary infection) or after the surgery (secondary infection). Primary infections are usually more serious, appearing within five to seven days of surgery. Majority of SSIs are uncomplicated involving only skin and subcutaneous tissue but sometimes can progress to necrotizing infections. The usual presentation of infected surgical wound can be characterized by pain, tenderness, warmth, erythema, swelling and pus formation. SSI development depends on peri-operative factors, some of

which can be modifiable like Diabetes mellitus, Hypertension, BMI, smoking. Intra operative risk factors also have an influence on SSI like surgical scrub technique and duration. Pre-operative antibiotic prophylaxis skin preparation, duration of surgery, technique of surgery, minimizing blood loss during surgery.

MATERIAL & METHODS:

STUDY DESIGN: This was a retrospective observational study.

STUDY POPULATION: The patients included into the study who underwent abdominal surgeries at OBGY Department in teaching institute in study duration and who fulfilled criteria of Surgical Site Infection.

SAMPLE SIZE: 30

DURATION OF THE STUDY:

The present study was conducted between January 2019 To June 2020.

RECORDS INCLUDE:

1)Patients indoor hospital records
2)Operative theatre records
3)Anesthetic chart records
4) Laboratory reports
5) Theatre master record book

Protocol Used for maintaining Normothermia

Use warmed forced-air blankets preoperatively, during surgery, and in the post Anesthesia care unit (PACU)

Use warmed IV fluids

Use warming blankets under patients on the operating table Designate responsibility and accountability for thermoregulation.

STUDY PROCEDURE :

Details of case fitting the definition of surgical site infection will be included in the case Record proforma and analyzed. Analysis *interpretation* done on the basis of the objective defined. Data related to various outcome variables like age, associated risk factors, indication and Nature of surgery-emergency or elective, route and technique of surgery, duration of surgery And anesthesia, intra -operative complications, infective morbidity, surgical site infections, Hospital stay, wound related complications was collected from hospital records (admission discharge register, operation theatre register, anesthesia register, indoor case file, treatment R

INCLUSION CRITERIA:

All surgeries performed in the department of Obstetrics and Gynaecology during the study Period with abdominal surgical site infection.

EXCLUSION CRITERIA:

Any infected Surgical Site Infection other than abdominal surgeries.

Patient that stayed in the hospital for less than 24 hrs postoperative were not included in the study./

OBSERVATIONS & RESULTS:

In the present study we observed 30 study cases to evaluate surgical site infection in Obstetric and Gynecological surgeries with reference to abdominal surgical incisions. **Table No.01 : Age wise distribution of study cases.**

Age	No. of cases	Percentage
18 to 20	00	00
21 to 30	13	43
31 to 40	08	27
41 to 50	08	27
51 to 60	01	03
> 60	00	00
Total	30	100

Among the all study subjects maximum 13 (43%) patients belong to age group 21 to 30 years, followed by 31 to 40 and 41 to 50 year age groups consisting of 8 (27%) patients in each group.

Graph No.01: Age wise distribution of study cases.

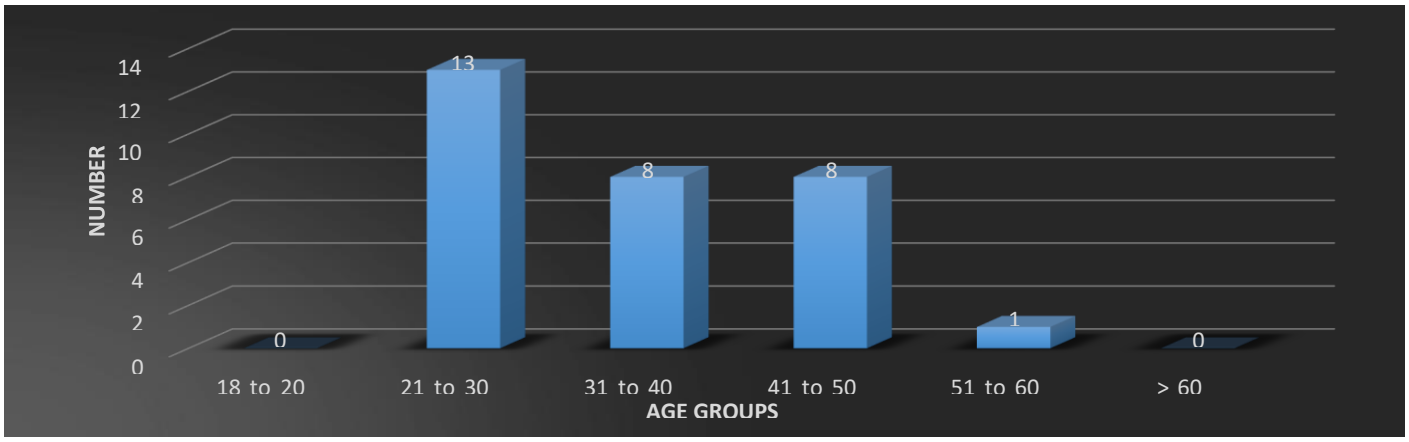


Table No.02 : Distribution of study cases according to type of surgery.

Type of surgery	**No. of cases**	**Percentage**
Elective Cesarean Delivery	6	20
Emergency Cesarean Delivery	13	43
Total abdominal Hysterectomy	11	37
Total	30	100

We observed that among all cases 43% surgeries were planned in the emergency, 20% were elective while 37% were other i.e. total abdominal hysterectomy.

Graph No.02: Distribution of study cases according to type of surgery.

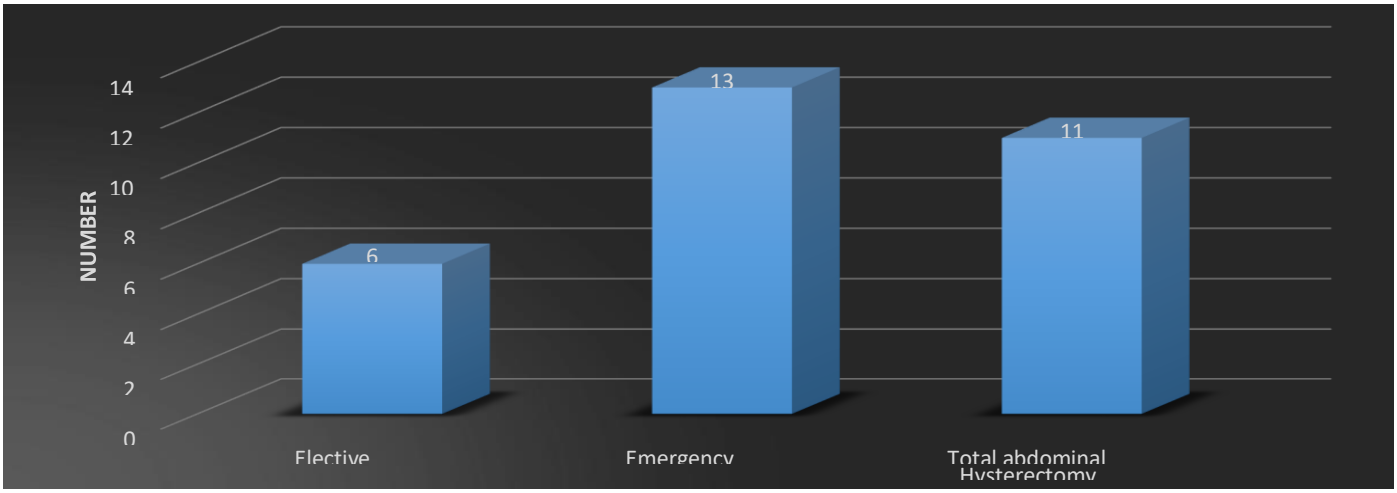


Table No.03 : Distribution of study cases according to duration of surgery.

Duration of surgery	No. of cases	Percentage
Less than 1 hr	3	10
1 to 2 hr	21	70
More than 2 hr	6	20
Total	30	100

The time taken for surgery in maximum 21 (70%) study cases was between 1 to 2 hours. More than 2 hours in 6 (20%) cases while less than 1 hour taken for surgery in 3 (10%) cases.

Graph No.03: Distribution of study cases according to duration of surgery.

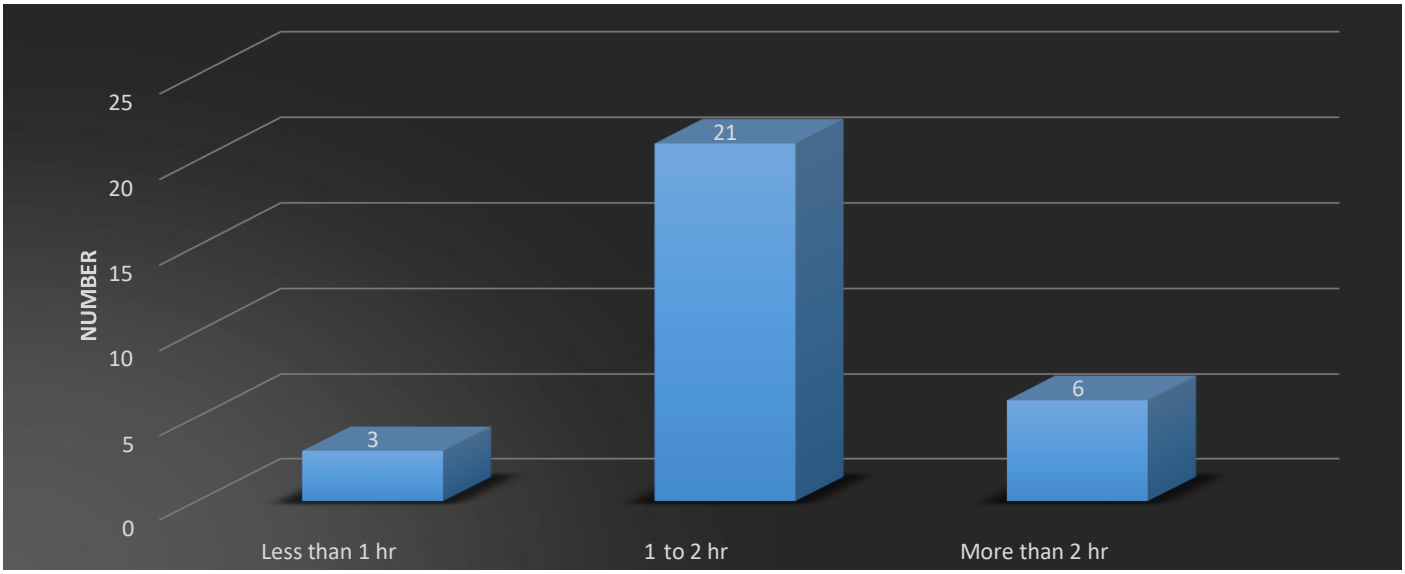


Table No. 04: Distribution of study cases according to preoperative care.

Preoperative Care	No. of cases	Percentage
Appropriate Hair Removal	23	77
Bowel Preparation	16	53
Glycemic Control	24	80

In our study as preoperative care appropriate hair removal done in 23 (77%) cases, bowel preparation was needed in 16 (53%) cases while glycemic control was done in 24 (80%) study cases.

Graph No.04: Distribution of study cases according to preoperative care.

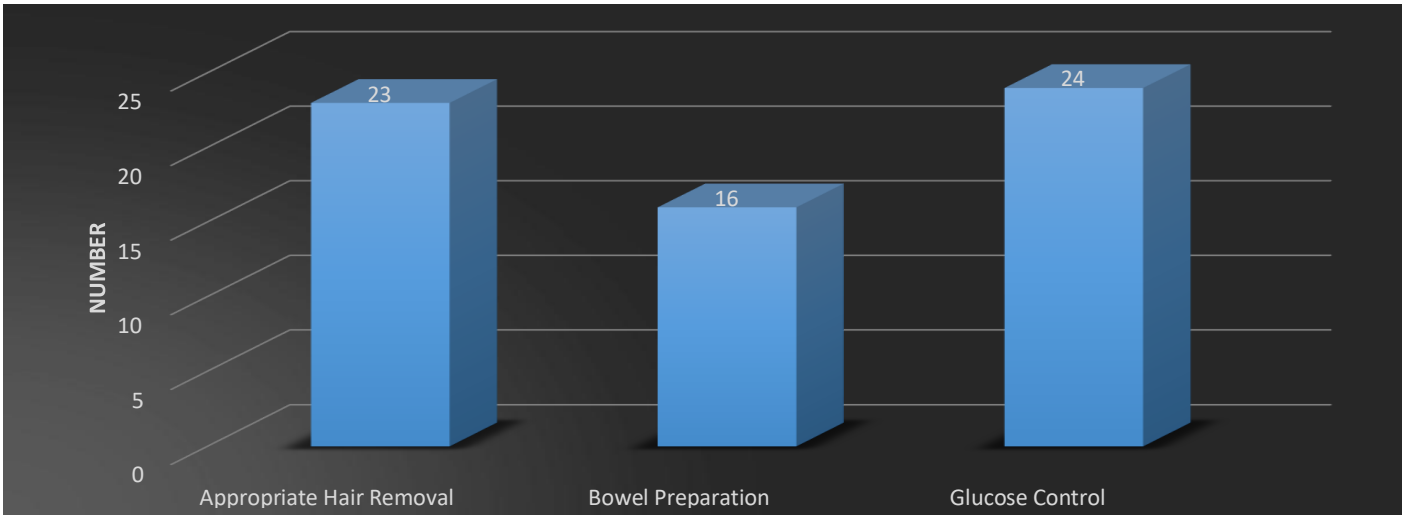


Table No. 05: Distribution of study cases according to perioperative events.

Perioperative Care	No. of cases	Percentage
Perioperative Transfusion	04	13
Maintaining Normothermia	28	93
Closure of subcutaneous tissue by vicryl	23	77
Closure of subcutaneous tissue by catgut	07	23
Drain	01	03
Type of Dressing Dynaplast (Elastic adhesive bandage)	14	47
Type of Dressing Tegaderm(Transparent film dressing)	16	53

In this study preoperative transfusion was given to 4 (13%) patients. Normothermia maintained in 28 (93%) cases and not maintained in 2(7%). Vicryl (Polygalactin 910) was used to closure of subcutaneous tissues in 23 (77%) cases while catgut used in 7 (23%) cases. (53%) cases. Bath with antiseptic was given in 29 (97%) cases.

Graph No.05: Distribution of study cases according to perioperative events.

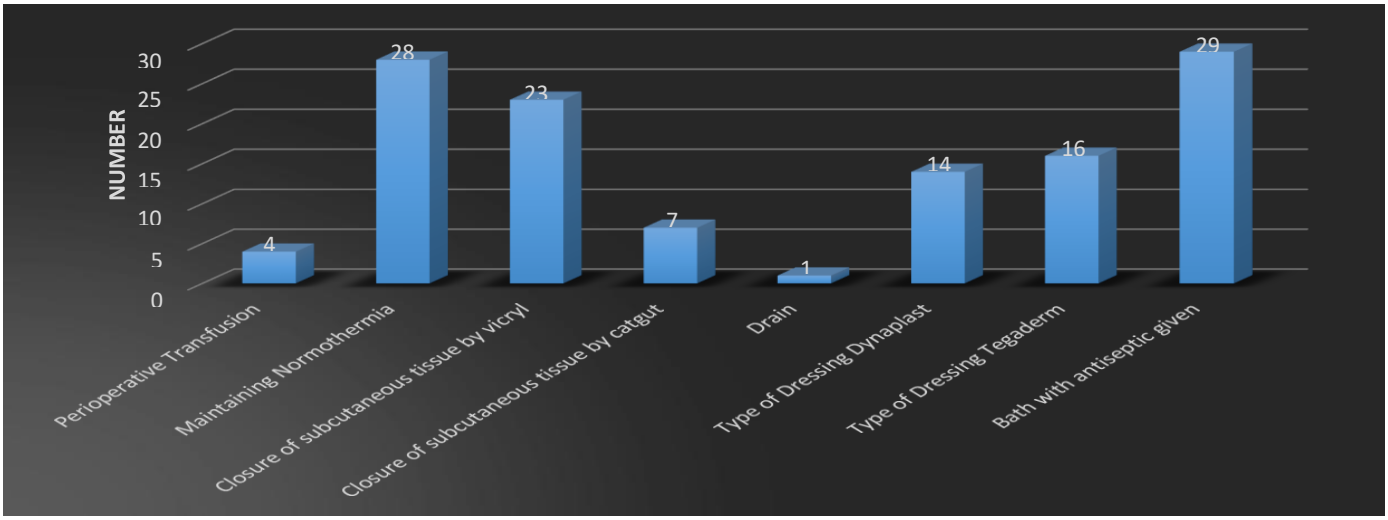


Table No. 06: Distribution of study cases according to wound class.

Wound Class	No. of cases	Percentage
Class I	29	97
Class II	01	03
Total	30	100

In our study we found that 29 (97%) study cases were with Class I wound while 1 (3%) case was with Class II wound.

Graph No.06: Distribution of study cases according to wound class.

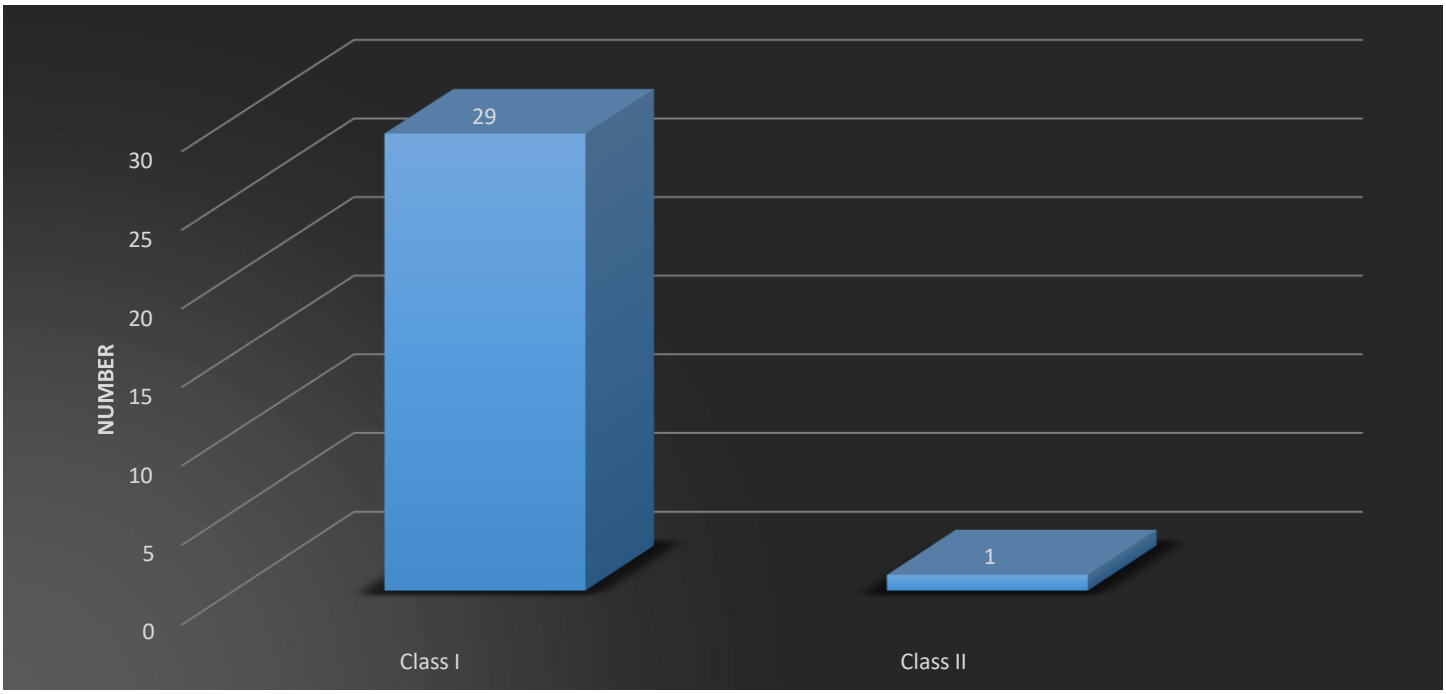


Table No. 07: Distribution of study cases according to post-operative care.

Postoperative Care	No. of cases	Percentage
Antibiotics Given		
Third Generation Cephalosporin	8	20
Penicillin derivatives	21	70
Piptaz with aminoglycosides	1	**3**
Antibiotics timing		
10 min	1	3
15 min	2	7
20 min	1	3
30 min	12	40

60 min	9	30
120 min	5	17
Duration of Admission (in days)		
10	7	23
15	10	33
17	2	7
20	7	23
25	3	10
30	1	3

We gave third generation cephalosporines to 8 (27%) cases, penicillin derivatives to 21 (70%) cases and piptaz with aminoglycosides to 1 (3%) cases. The timing of antibiotics administration after surgery was 10 min in 1 (3%) study cases,15 min in 2 (7%), 20 min in 1 (3%), 30 min 12 (40%) ,60 min in 9 (30%) while 120 min in 5 (17%) study cases. days by 7 (23%) study cases.

Graph No.07: Distribution of study cases according to post-operative care.

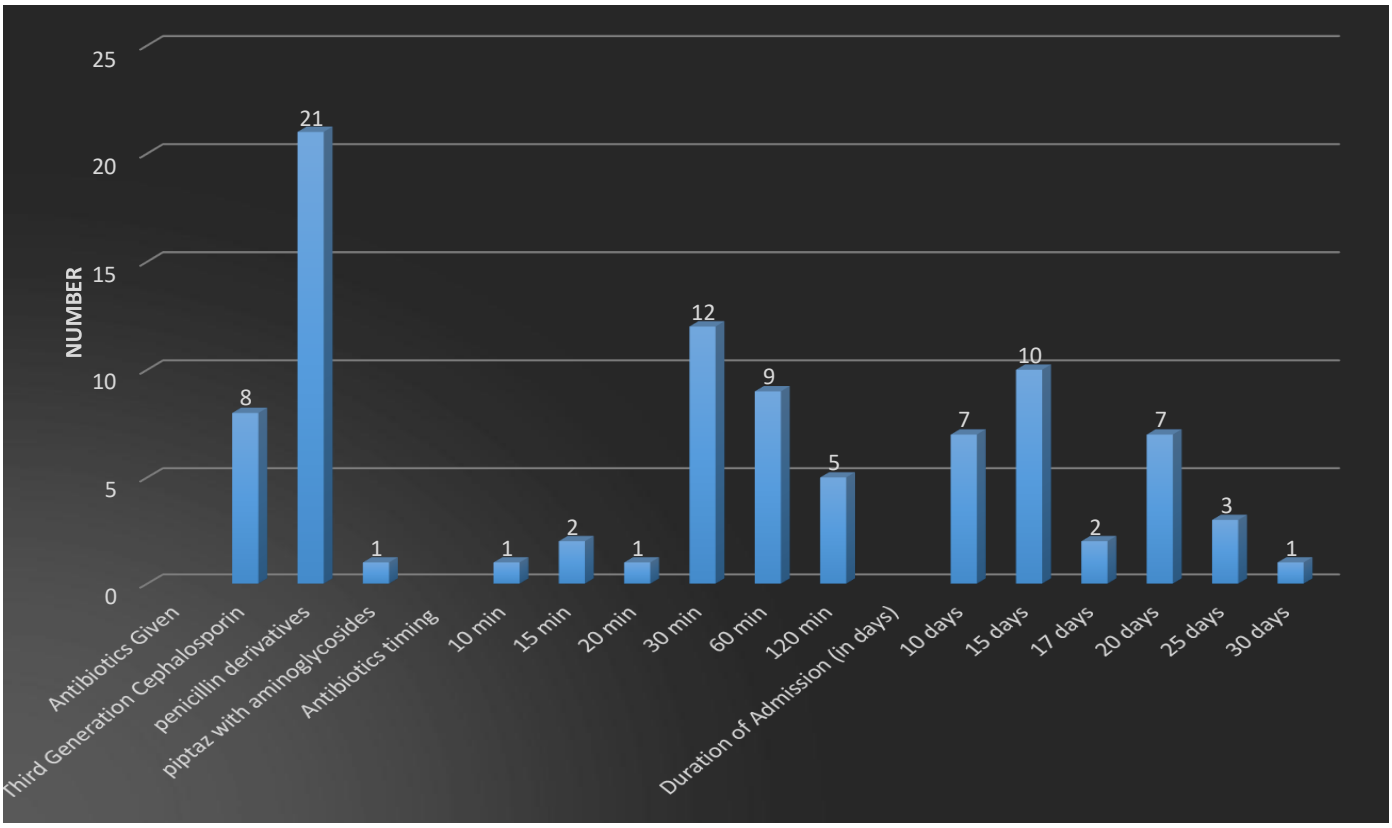


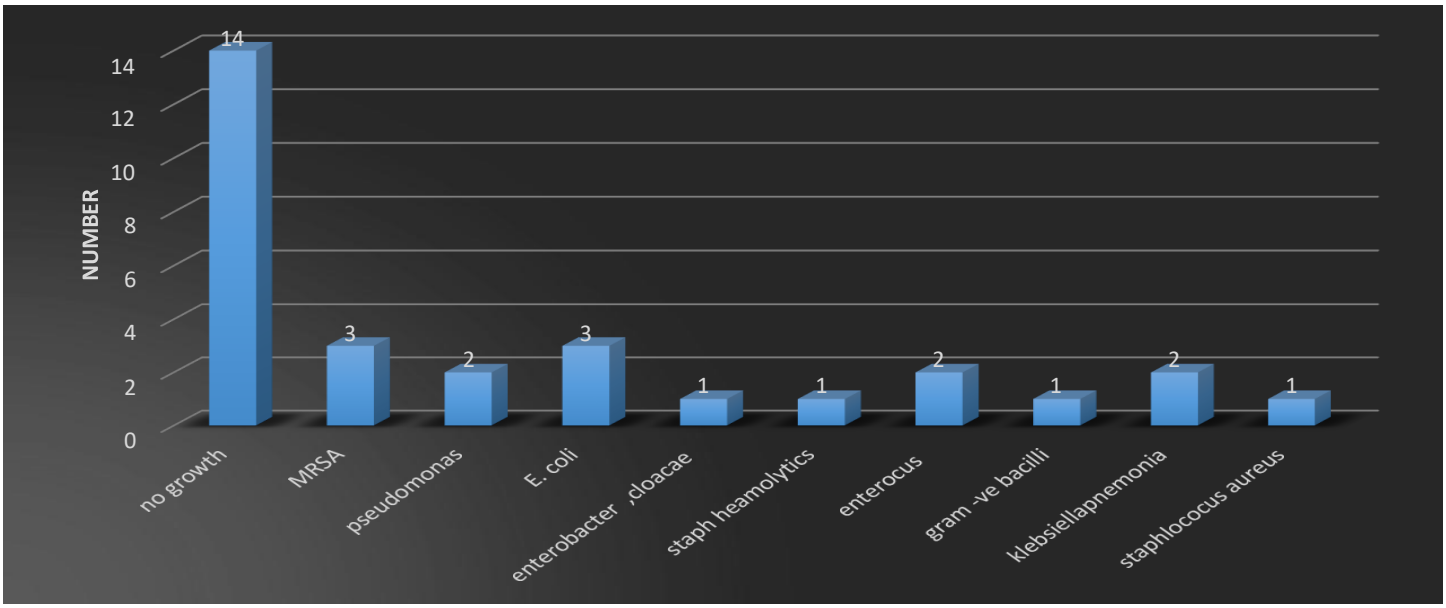
Table No. 08: Distribution of cases according to culture organism.

Culture organism	No. of cases	Percentage
No growth	14	47
Methicillin-resistant Staphylococcus aureus	3	10
Pseudomonas	2	7
Escherichia coli	3	10
Enterobacter ,cloacae	1	3

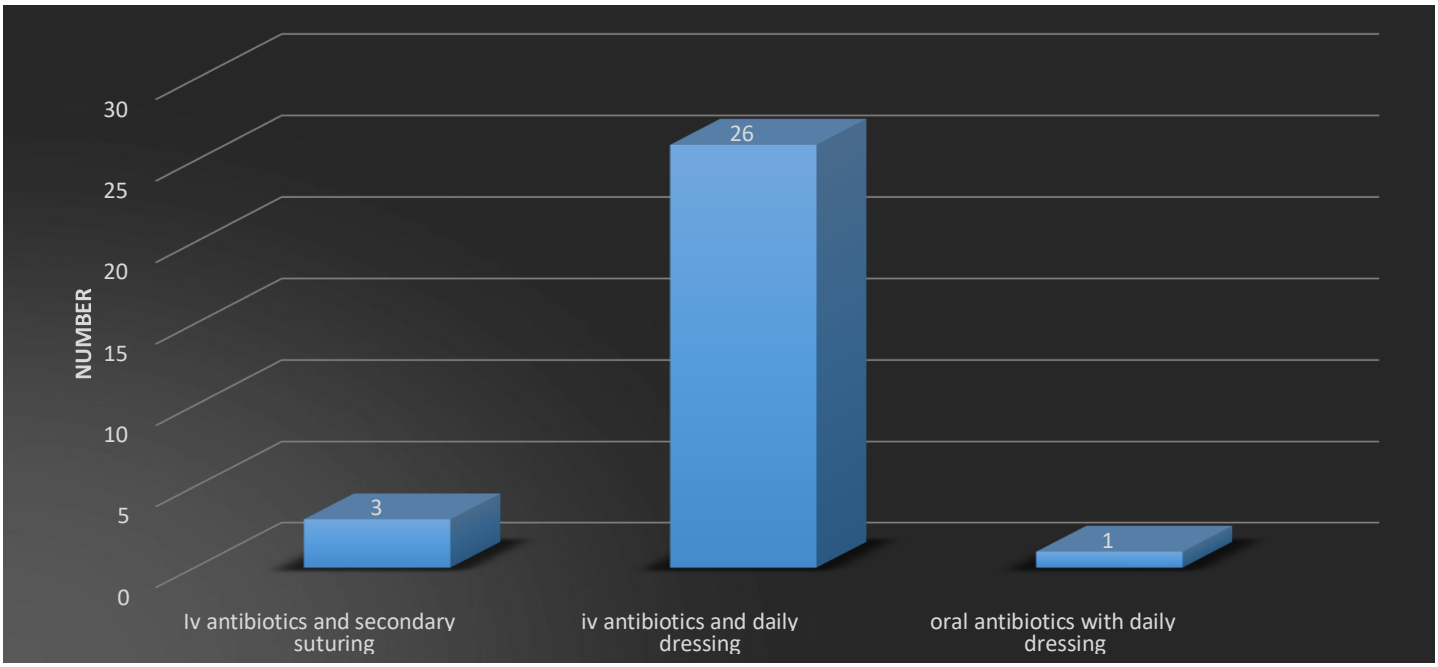
Staphylococcusheamolyticus	1	3
Enterococus	2	7
Gram negative bacilli	1	3
klebsiellapnemonia	2	7
Staphlococcus Aureus	1	3
Total	30	100

No growth of organism in the culture seen in 14 (47%), MRSA seen in 3 (10%), pseudomonas in 2 (7%), E. coli in 3 (10%) while enterocus and klebsiella pnemonia in 2 (7%) cases respectively.

Graph No. 08: Distribution of cases according to culture organism.



Graph No. 09: Distribution of cases according to treatment given.



Treatment	No. of cases	Percentage
Iv antibiotics and secondary suturing	3	10
iv antibiotics and daily dressing	26	87
oral antibiotics with daily dressing	1	3
Total	30	100

In the present study treatment given Iv antibiotics and secondary suturing to 3 (10%) study cases. IV antibiotics and daily dressing done in 26 (87%) study cases while oral antibiotics with daily dressing given to 1 (3%) study cases..

DISCUSSION:

In the present study, 30 cases were included at OBGY Department in the study duration between July2018 to December 2020. In the cases studied surgical site infection in obstetric & gynecological surgeries with reference to abdominal surgical incisions were only taken. Among the all study subjects maximum 13 (43%) patients were belonging to age group 21 to 30 years, followed by 31 to 40 and 41 to 50 year age groups consisting of 8 (27%) patients in each group. We observed that among all cases 43% surgeries were in the emergency setting, 20% were elective while 37% were other i.e. total abdominal hysterectomy, which was in a planned setting. We observed that time taken for surgery in maximum 21 (70%) study cases was between 1 to 2 hours. More than 2 hours in 6 (20%) cases while less than 1 hour taken for surgery in 3 (10%) cases. In this study preoperative transfusion was given to 4 (13%) patients. Normothermia maintained in 28 (93%) cases. Vicryl was used to closure of subcutaneous tissues in 23 (77%) cases while catgut used in 7 (23%) cases. Drain required in 1 (3%) cases. Dynaplast used for dressing in 14 (47%) cases while tegaderm was used in 16 (53%) cases. Bath with antiseptic was given in 29 (97%) cases. An explanation for risk for SSI following blood transfusion remains unclear and probably reflects a proxy for severe anemia and consequent low oxygen carrying capacity and delivery to the tissues, potential contamination, and transfusion related immunomodulation in presence of critical illness. Blood transfusion, Normothermia and antiseptic baths have always played significant factors. However most of the surgical references are for colorectal surgeries and dirty wounds. In our study, it was universal for nearly all patients to have an antiseptic bath or the incisional area clean and prepared with Cetavalon solution, however it seems to have not reated any significant change in the outcome. The possible explanation may be presented at this stage as other factors may have played a more dominant reason for the SSI to occur, including the possibility of heavier dose of innoculum, or even BMI. In our study we found that 29 (97%) study cases were with Class I wound while 1 (3%) case was with Class II wound. Demisew A et al[94]observed that sixty five percent of women who developed SSIs had clean contaminated wounds at the time of surgery and the rest had contaminated or dirty wounds. Wound class at the time of surgery had a strong statistical association with the severity of SSIs. Those who had contaminated/dirty wounds at the time of surgery had more severe type of surgical site infections (deep and organ/space), more likely to have relaparotomy, longer postoperative hospital stay and higher maternal mortality. BharatnurS et al[1] observed that as the class of surgical wound increased, the incidence of SSI increased. The incidence of SSI was significantly higher in clean contaminated and dirty wounds as compared to clean wound. NaphadeS et al[90] found that SSI was more common in clean contaminated surgeries than clean surgeries. Our findings were consistent with the studies done on SSI amongst surgery and gynaecology cases. According to antibiotic sensitivity we gave third generation cephalosporines to 8 (27%) cases, penicillin derivatives with Clavulanic Acid combination to 21 (70%) cases and Piperacillin with Tazobactum combination with aminoglycosides to 1 (3%) cases. These antibiotics were given according to the unit protocol and the prevailing microbial sensitivity. The timing of antibiotics administration after surgery was 10 min in 1 (3%) study cases,15 min in 2 (7%), 20 min in 1 (3%), 30 min 12 (40%) ,60 min in 9 (30%) while 120 min in 5 (17%) study cases. Duration of hospital stay of maximum i.e 10 (33%) study cases was 15 days, followed by 10 days by 7 (23%) and 20 days by 7 (23%) study cases. Pathak A et al[5] in there study given antibiotic prophylaxis within 1 hr to 512 and after 1 hour to 640 study patients. The

duration of post-operative stay was 1 to 7 days for 663 patients, 7 to 14 days for 424 patients and more than 14 days for 86 study cases. Inappropriate timing of antibiotic prophylaxis was a significant risk factor for SSI. Similar results have been reported earlier and are also in line with recommendations from prophylaxis guidelines . However, during the study period no standard policy for prophylaxis was followed. The American Congress of Obstetricians and Gynecologists recommends pre-operative antibiotic prophylaxis for hysterectomies, induced abortions, hysterosalpingography, and uro-gynacological procedures. Naphade S et al[90] stated that longer perioperative hospital stay was shown to be associated with increased risk of SSI. In our study population, the hospital stay was significantly higher for patients with SSI which was mean 16 days and these results were consistent with other studies. This could be the effect of SSI rather than causal relationship leading to the occurrence of SSI. Bangal A et al[92] stated that hospital acquired infections occur worldwide and affect both developed and resource-poor countries. Infections acquired in health care settings are responsible for increase in morbidity and mortality. They are a significant burden both for the patient and for public health. A prevalence survey conducted under the auspices of WHO in 55 hospitals of 14 countries representing 4 WHO Regions (Europe, Eastern Mediterranean, South-East Asia and Western Pacific) showed an average of 8.7% of hospital patients had nosocomial infections. No growth of organism in the culture seen in 14 (47%), MRSA seen in 3 (10%), pseudomonas in 2 (7%), E. coli in 3 (10%) while enterococuss and klebsiella pnemonia in 2 (7%) cases respectively;.enterobacter ,cloacae, staph heamolytics, gram -ve bacilli and staphlococusaureus found in 1 (3%) study cases respectively. In our study nearly half the patients with SSI had no organisms growing through the wound swab. It nearly matches with studies done for superficial wound gape. The interesting factor was the presence of MRSA in 10% of the cases. The fact that each patient underwent active surveillance for carrier status and was not seen to be carriers. In their cases their close relatives and attending health care workers too underwent surveillance for MRSA carrier status and were found to be not carriers. None of the MRSA positive swab patients were suffering from any serious wound dehiscence. We found that type of surgical site infection was superficial in all 30 (100%) cases. PathakA et al[5] reached to the similar observations also that most of the SSIs found in there study were superficial SSI. This is similar to other studies from resource-constrained settings. In USA also approximately two-thirds of the SSI are superficial and remaining deep. In the present study treatment given Iv antibiotics and secondary suturing to 3 (10%) study cases. Iv antibiotics and daily dressing done in 26 (87%) study cases while oral antibiotics with daily dressing given to 1 (3%) study cases. Also the management of comorbid patients associated with anemia, obesity, diabetes mellitus and hypertension was done accordingly. Pathak A et al[5] stated that diabetes has been significantly associated with SSI secondary to gynecological surgeries. The specific risk reported in hysterectomies is 1.54 times. Patients of diabetes especially with poor glycemic control share much comorbidity, like obesity, poor nutritional status, poor peripheral oxygen supply, and metabolic derangements. Obesity is an uncertain risk factor for SSI in gynecological surgeries. It has been shown in one study that rather than obesity, subcutaneous thickness as measure by MRI could be more important risk factor for SSI. Patients with hypertensive disorder of pregnancy have been shown to have 2.9 times higher risk for SSI. A history of cerebrovascular accidents with neurological deficit has been shown to increase the risk of SSI by 4.41 times. Bhagat J et al[10] in there study stated that certain underlying conditions like diabetes, obesity, anemia and smoking may alter or decrease the immune status thus significantly increasing the risk of SSI. Patients of diabetes especially with poor glycemic control share much comorbidity, like obesity, poor nutritional status, poor peripheral oxygen supply, and metabolic derangements. In present study, Prevalence of SSI was significantly higher in cases with associated co-morbidities like obesity (42.9% vs 7.5%;).This could be due to abnormalities in cell-mediated immunity and phagocyte function associated with hyperglycemia, as well as diminished vascular supply to tissue and increased rate of colonization of S. aureus in the skin folds.

CONCLUSION:

Incidence and risk factors from prospective SSI surveillance can be reported simultaneously for the Obstetric and Gynecological surgeries and can be part of routine practice in resource- constrained settings. Surgical site infections cannot be completely eradicated; however, it can be curtailed by proper evaluation of the patient so that the burden of the disease, both for patients and the healthcare service providers can be reduced in terms of the morbidity and mortality. It can also bring down the hospitalization days and its cost .Though surgical care is very important to prevent wound infection, but some pre and post operative steps can reduce post operative wound infections also. Incidence

of infection was more in emergency cases than elective cases because elective cases are clean and proper preoperative workup with antibiotic prophylaxis is usually done in elective cases at appropriate setting. We can reduce the rate of SSI by proper preoperative work up. We should correct patient's anemia, control their blood sugar levels; treat any infective focus like per vaginal discharge. Laparoscopic or vaginal route should be preferred rather than open abdominal approach. E. Coli was found to be the most common responsible pathogen for wound infection followed by MRSA species. Early identification of risk factors and prompt intervention can prevent further morbidities due to post-operative surgical site infection. Total hospital stay was significantly longer in patients with SSI. This result is due to the SSI rather than the cause for it. So, we should be vigilant to identify as well as treat SSI as early as possible so as to decrease the economical burden on patients which occurs because of the prolonged hospital stay.

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